UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,239	07/24/2003	Douglas L. Kurz	2522/15	4180

26646 7590 02/08/2007

KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER	
. LEWIS, BEN	
ART UNIT	**PAPER NUMBER**
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/627,239	KURZ ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-44* is/are pending in the application.

4a) Of the above claim(s) *1-10,19-32 and 41-44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-18 and 33-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/09/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's election with traverse of Group II, Species I, claims 11-18 and 33-40, in Paper filed May 5th 2005 is acknowledged. The traversal is on the ground(s) that Group I and II are not independent. This is not found persuasive because inventions II and I are related as process of making and product made. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different product or (2) the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In this case, as admitted in the subject matter of the present claims the bipolar separator plate can be fabricated by two distinct processing procedures as recited in claims 11-18, 19-21, 33-40 and 41-44 respectively.

The requirement is still deemed proper and is therefore made FINAL. Therefore, claims 9-28 are withdrawn from consideration

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 11-14, 33,34, 37 and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Shiepe et al. (U.S. Patent No. 7,166,382).

With respect to claims 11 and 33, Shiepe et al. discloses a treated porous flow field members used to support membranes in electrochemical cells (abstract). Shiepe et al also teach that either porous flow field member **218** or **228** may be replaced with a conventional flow field member, such as a screen pack, bipolar plate, or the like (Col 6 line 45-53). Shiepe et al. also teach that suitable porous supports include screens, perforated sheets, pierced sheets, discretely etched sheets, sintered metal cloth, or woven mesh formed from metal or continuous strands of metal. In the alternative, the porous supports can comprise sintered powder or granular metal particles (Col 6 lines 60-67).

With respect to claims 11,12,14,33, 34, 38, these claims are product by process claims. The metallurgical bonding step of claims 11,12 and 14, do not further limit the product of claim 11. MPEP 2113 states, "Even though product-by-process claims are limited by and defined by the process, determination of patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F. 2d 698,227 USPQ 964,966 (Fed Cir. 1985).

With respect to claims 12,13 and 34, 37, Shiepe et al. teach that in FIG. 3, flow field member **318** comprises three layers **317**, **319**, **321**, each having differing void volumes oriented in order of decreasing porosity such that a layer **317** possesses a void volume larger than a second porous layer **319**, and the second porous layer **319** possesses a void volume larger than a third porous layer **321**. Differing void volumes may be provided by differing the size of the voids, the number of the voids, or both. Although it is shown in FIG. 3 that flow field member **318** is disposed within a flow field such that the first porous layer **319** having the largest void volume "higher warp and weft mesh counts" is disposed directly adjacent an electrode, the orientation of the gradient may also be reversed (Col 10 lines 25-45). Shiepe et al. also teach that the electrically conductive material may be in the form of a sheet having openings suitable for weaving or threading the elastomeric material. Differing degrees of porosity may be achieved by differing the stitch or weave spacing, by using elastomeric material of different thickness, or by using electrically conductive materials with differing void volumes (Col 9 lines 39-50).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims15, 16 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiepe et al. (U.S. Patent No. 7,166,382) in view of Foster (U.S. Patent No. 3,087,699) in view of Hirahara et al. (U.S. Pub. No. 2003/0209428 A1) and further in view of Bachner Jr. (U.S. Patent No. 6,559,079 B1).

With respect to claim 15, 16 and 39, Shiepe et al. discloses a treated porous flow field members used to support membranes in electrochemical cells (abstract) in paragraph 2 above. Shiepe et al. do not specifically teach wherein the warp and weft mesh counts of 42 wires per inch and having a nominal diameter of 0.0055". However, Foster disclose wire fabrics and methods of producing the same (title) wherein it has been proposed, for example, to employ individual strands of wires made of steel or a, similarly strong metal incorporated in the various fabric or rubber plies employed in building up tires or fuel cells (Col 1 lines 15-20). Foster also teach that, the weight, tear strength, tensile strength, and other physical properties of the fabric may be easily predetermined and controlled by the choice of wire diameter. The wire gauge should generally range from about 0.002" to about 0.030" (Col 3 lines 20-25). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate wires with the diameters of Foster into the fuel cell of Shiepe et al. because Foster teach that the weight, tear strength, tensile strength, and other physical properties of the fabric may be easily predetermined and controlled by the choice of wire diameter (Col 3 lines 20-25).

Shieppe et al. as modified by Foster do not specifically teach warp and weft mesh counts of 42 wires per inch. However, Hirahara et al. disclose a conductive carbonaceous fiber woven cloth (title) wherein when two-folded spun yarns of 2/40 Nm are used as warps and wefts, the yarn input for each of the warps and the wefts is generally from 100 to 300 yarns, preferably from 180 to 250 yarns, per 10 cm of the woven fabric. The spaces between warps and wefts preferably have a size of from 10 to 150 μm in terms of the diameter of corresponding pores as measured with a scanning electron microscope, from the standpoint of securing water-holding/water-releasing properties during use as a gas diffusion material in fuel cells (Paragraph 0055). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the weave density of Hirahara et al. into the flow field member of Shieppe et al. as modified by Foster because Hirahara et al. teach that the spaces between warps and wefts preferably have a size of from 10 to 150 μm in terms of the diameter of corresponding pores as measured with a scanning electron microscope, from the standpoint of securing water-holding/water-releasing properties during use as a gas diffusion material in fuel cells (Paragraph 0055).

With respect to the angular orientations of the layers, Shieppe et al. as modified by Foster and Hirahara et al. do not specifically teach an arrangement of layers in a repeatable sequence of angular orientations of (0°, 45°, 0°). However, Bachner Jr. disclose a thing and light weight ballistic resistant pad with groups of angularly displaced woven sheets (title) wherein, one group of sheets will have, for example, 90° orientation, FIG. 3, (in which the warp fibers are placed at 90° from horizontal), the next

adjacent group of sheets will be angularly displaced and will have, for example, a 45° orientation, FIG. 4, (in which the warp fibers are placed at 45° from horizontal), and the next adjacent group of sheets thereafter will be positioned in the 90° orientation followed by another group of sheets positioned in the 45° orientation with this pattern of warp/weft angular displacement between subsequent groups of sheets repeating for all of the groups comprising the ballistic resistant pad. Thus, in this embodiment, the warp and weft of the successive overlying sheets of every other group, within the successive groups of the pad, are substantially in alignment with one another. By positioning the warp and weft arrangements at different angles, the number of directions for the dispersion of energy are increased upon a ballistic impact to the sheets of the pad (Col 5 lines 40-67). Therefore it would have been obvious to one of ordinary skill in the art at time the invention was made to incorporate the angular orientation of the layers of Bachner Jr. into the flow field of Shieppe et al. as modified by Foster and Hirahara et al because Bachner Jr. teach that by positioning the warp and weft arrangements at different angles, the number of directions for the dispersion of energy are increased (Col 5 lines 40-67)

5. Claims17, 18 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiepe et al. (U.S. Patent No. 7,166,382) in view of Foster (U.S. Patent No. 3,087,699) in view of Hirahara et al. (U.S. Pub. No. 2003/0209428 A1) in view of Bachner Jr. (U.S. Patent No. 6,559,079 B1) and further in view of Brown et al. (U.S. Patent No. 3,006,384).

With respect to claims 17, 18 and 40, Shiepe et al. as modified by Foster as modified by Hirahara et al. as modified by Bachner Jr. disclose a flow field plate in paragraph 4 above. They do not specifically mention the use of austenitic steel. However, Brown et al. disclose a woven wire belt (title) wherein brown uses austenitic steel (Col 2 lines 30-72). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the austenitic steel of Brown et al. into the flow field plate of Shiepeet al. as modified by Foster as modified by Hirahara as modified by Bachner Jr. et al. because Brown et al. teach that austenitic steel is a corrosion resistant alloy (Col 2 lines 30-72).

6. Claims 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiepe et al. (U.S. Patent No. 7,166,382) in view of Brady et al. (U.S. Pub No. 2004/0033410 A1).

With respect to claims 35 and 36, Shiepe et al. discloses a treated porous flow field member used to support membranes in electrochemical cells (abstract) in paragraph 2 above. Shiepe et al. do not specifically teach at least one gas barrier comprises a solid metal foil. However, Brady et al. disclose a fuel cell bipolar plate (title) wherein, the bipolar plates 22 of the present invention, as best shown in FIG. 3, include a first thin metal foil 70 that is bonded to an electrically conductive porous material 72 such as a metal or carbon foam. A second thin metal foil 74 is bonded to a second side of the electrically conductive foam 72. The first and second thin metal foil layers have a thickness of less than 0.005 inches and preferably about 0.001 inches.

The metal foils can be different materials to accommodate the differences in anode and cathode environments. A flow field pattern is then stamped into the material to provide anode and cathode gas channels 76,78 and also to locally compress the foam material to a much higher density subjacent anode flow channel 76. In this manner, regions of low density are bounded by regions of high density to form coolant channels 80 for the coolant to flow therethrough. The regions of high density also increase the conductivity of the bipolar plate by decreasing the bulk resistance in the area of the high density regions (Paragraph 0018). Therefore it would have been obvious to one of ordinary skill in the art to incorporate the metal foil of Brady et al. into the flow field members of Shiepe et al. because Brady et al. teach that heat transfer is better because of the much thinner metal (Paragraph 0024).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ben Lewis

PATRICK JOSEPH [illegible]
SUPERVISORY PATENT EXAMINER

Patent Examiner
Art Unit 1745